

**SOLE INVENTOR**

**APPLICATION FOR  
UNITED STATES LETTERS PATENT**

**S P E C I F I C A T I O N**

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**TO ALL WHOM IT MAY CONCERN:**

**Be it known that I, ALEXANDER M. ROTHACKER, a citizen of  
Canada, residing at 33439 North Park, Wildwood, Illinois 60030, have invented  
a new and useful INCREMENTAL WEIGHT TRAINING SYSTEM, APPARATUS,  
AND METHODS, of which the following is a specification.**

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INCREMENTAL WEIGHT TRAINING SYSTEM, APPARATUS, AND METHODS

**BACKGROUND OF THE INVENTION**

1. Field of the Invention

5           The present invention relates to weight training. More particularly, the present invention relates to an incremental weight system for use in weight training.

2. Description of Related Technology

10           <sup>61</sup> The use of weights and other forms of resistance for weight training is well-known. Typically, a desired resistance for weight training is produced by loading a standard olympic barbell with standard olympic weights or by selecting a desired weight resistance on a cable-type weight training apparatus. Generally, increments of less than one and one quarter pounds are not available for adjusting the weight resistance of a standard olympic barbell, and increments of less than five pounds are not available for adjusting the weight resistance of a cable-type weight training apparatus. Accordingly, while incremental weight systems for weight training have been disclosed, the smallest weight increment available for adjusting a desired exercise resistance is typically at least one and one quarter pounds.

15           Nonetheless, weight increments smaller than one and one quarter pounds have been disclosed for use in some athletic training methods. For example, U.S. Pat. No. 4,444,396 discloses a weighted golf swing exercise club including a set of circular disks comprising one-ounce, two-ounce, four-ounce, eight-ounce, and sixteen-ounce weights. According to this patent, a golfer can strengthen muscles used in golf and reduce the risk of injury by practicing with (and gradually increasing the weight of) the weighted golf swing exercise club.

20           More recently, weight increments less than one and one quarter pounds have been discussed in the context of more conventional weight training methods. For example, Ian K. Smith, M.D., advocates that a child's exercise intensity be increased in one or two pound increments. (See Ian K. Smith, M.D., *Pumping Iron Jr.*, Time, March 5, 2001, at 81.) However, a one or two pound increase in exercise

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resistance is too large of an increase for adults, and such an increase in exercise resistance is proportionally larger for children.

92 Commercially available weight lifting products such as the PlateMate® Hex and the PlateMate® Donut, which are available in increments ranging in weight from 5/8 pounds to 2.5 pounds, have been designed to address this problem. The vendor advocates that strength training with such incremental increases is a smarter and safer way to successful strength training that allows weight lifters to break through "the plateau" to achieve the highest level of success in weight training. However, the lowest available PlateMate® weight increment of 5/8 pounds is too large of a weight increase for most adult muscle groups, and is certainly too large of an increase for both children and persons rehabilitating injuries. Furthermore, if the lowest PlateMate® increment is to be used with a standard olympic barbell, a weight lifter must increase exercise resistance by two times 5/8 pounds or by one and one quarter pounds. As previously discussed, this is a substantial increase in exercise resistance, and a weight lifter risks muscle, tendon, and/or ligament injury by undertaking such a large increase.

Additionally, it would be impossible for a weight lifter to continuously increase exercise resistance between workouts by one and one quarter pounds. If a weight lifter attempted to continuously increase exercise intensity between workouts by such an amount, the weight lifter's form will eventually deteriorate because of the additional weight, and the weight lifter's risk of injury will increase.

Further, because one cannot stack PlateMate® products upon one another, weight increments other than those directly available from the vendor can not be used.

Accordingly, it is desirable to provide an incremental weight system having small weight increments to reduce a weight lifter's risk of injury.

Additionally, it is desirable to provide an incremental weight system having small weight increments that allow a weight lifter to make consistent weight lifting gains and achieve strength training goals.

Furthermore, it is desirable to provide an incremental weight system that allows for the production of a wide variety of incremental weight increases.

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Moreover, it is also desirable to provide an incremental weight system that is adapted for use with both a standard barbell and a cable-type weight training apparatus.

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## SUMMARY OF THE INVENTION

The present invention provides an incremental weight system having weight increments ranging in weight from about one quarter-ounce to about thirty two-ounces in order to reduce a weight lifter's risk of injury.

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Additionally, the invention provides an incremental weight system having weight increments ranging in weight from about one quarter-ounce to about thirty two-ounces in order to allow a weight lifter to make consistent weight lifting gains and achieve strength training goals.

Moreover, the invention provides an incremental weight system that allows for the production of a wide variety of incremental weight increases

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The invention also provides an incremental weight system that is adapted for use with both a standard barbell and a cable-type weight training apparatus.

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~~23~~ According to one aspect of the invention, an incremental weight system adapted for use in weight training comprises a plurality of incremental weights ranging in weight from about one quarter-ounce to about thirty two-ounces. Each incremental weight comprises a thin disk having a center opening adapted to receive a standard olympic barbell and a slot adapted to receive a weight-bearing cable of a cable-type weight training apparatus.

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~~24~~ According to another aspect of the invention, an incremental weight training apparatus comprises a standard olympic barbell, a set of standard olympic weights, and a plurality of incremental weights ranging in weight from about one quarter-ounce to about thirty two-ounces. Each incremental weight comprises a thin disk having a center opening adapted to receive the standard olympic barbell and a slot extending from the center opening to the perimeter of the disk.

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In accordance with another aspect of the invention, an incremental weight training apparatus comprises a cable-type weight training apparatus, and a plurality of incremental weights ranging in weight from about one quarter-ounce to about thirty two-ounces. Each incremental weight comprises a thin disk having a

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center opening and a slot extending from the center opening. The slot is adapted to receive a weight-bearing cable of the cable-type weight training apparatus.

95 According to another aspect of the invention, an incremental weight having a weight of about one quarter-ounce is adapted for use with both a standard olympic barbell and a cable-type weight training apparatus.

96 In accordance with another aspect of the invention, an incremental weight having a weight of about one half-ounce is adapted for use with both a standard olympic barbell and a cable-type weight training apparatus.

97 In accordance with yet another aspect of the invention, an incremental weight having a weight of about one-ounce is adapted for use with both a standard olympic barbell and a cable-type weight training apparatus.

Moreover, according to an additional aspect of the invention, a method of incrementally increasing a person's strength by incremental weight training is provided. The method comprises the steps of selecting a starting resistance, adding incremental weights ranging from about one quarter-ounce to about thirty two-ounces to the starting resistance in increments of less than about five-ounces, and executing a weight training exercise. The person selects and incrementally adds the incremental weights to increase the resistance for a subsequent workout to consistently achieve small incremental gains in strength without causing injury and/or failure.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

FIG. 1 is a perspective view of an incremental weight according to the invention;

98 FIG. 2 is a perspective view of an incremental weight of the invention used in conjunction with a standard olympic barbell weight training apparatus;

FIG. 3 is a perspective view of an incremental weight of the invention received by a weight bearing cable of a cable-type weight training apparatus; and,

FIG. 4 is a perspective view of an incremental weight of the invention used in conjunction with a cable-type weight training apparatus.

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## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

For many years the conventional wisdom in weight training could accurately be summarized by the phrase "no pain, no gain." Today, however, it is generally understood that the wisdom espoused by this alleged axiom is inaccurate. Nonetheless, conventional weight lifting systems generally require the use of at least one and one quarter pound weight increments, a substantial increase in exercise resistance.

Increasing the weight resistance of an exercise often subjects persons to considerable risks of injury. Typically, when an injury does occur during weight training, a tendon or ligament is injured because tendons and ligaments generally can not handle as large of increases in weight resistance as muscle tissues. Further, as a result of receiving approximately three to four times less blood flow than muscles, tendons and ligaments build in strength about three to four times more slowly than muscles.

To build the strength of tendons, ligaments, and muscles safely and without injury, small weight increases in exercise intensity should be observed. The risk of injury is not increased for the user when small incremental increases in exercise intensity are observed because muscles, tendons, and ligaments can generally handle smaller incremental increases. By providing an incremental weight system including a plurality of incremental weights ranging in weight from about one quarter-ounce to about thirty two-ounces, the invention allows for persons to increase exercise intensity without risking muscle, tendon, and/or ligament injury.

Furthermore, consistent strength gains without injury and failure can be made by the user when small, incremental increases are observed. While it may seem insignificant to increase exercise intensity between workouts by a one-ounce increment, over the course of a year, a continuous one-ounce increase in exercise intensity in a three day per week workout program results in a total exercise intensity increase of nine and three quarter pounds. Moreover, by providing such small incremental increases the weight system of the invention permits persons to increase exercise intensity without sacrificing good weight training form.

As exercise resistance is increased, it is necessary to monitor a person's weight lifting form and a person's speed in weight lifting movement. By monitoring these indicia of weight training performance, one can determine if an increase is an appropriate increase in exercise intensity or if it is too large of an increase for the person to handle. If a person's form deteriorates, or if weight lifting movement

becomes rushed or non-continuous, a smaller increase in exercise intensity should be used.

Weight lifters frequently describe encountering a "plateau" in their weight training programs. By this term, it is meant that the weight lifter can no longer handle increases in exercise intensity with good weight training form. Typically, plateaus occur when the increase in exercise intensity becomes too large for a person's tissues to handle. By providing an incremental weight system including a plurality of incremental weights ranging in weight from about one quarter-ounce to about thirty two-ounces, the invention allows for persons to increase exercise intensity more regularly and, to thereby more readily achieve strength training goals. Additionally, because strength gains can continuously be made, going to the gym and working out is more satisfying, both physically and mentally.

One of the most important aspects of the incremental weight system in accordance with the invention is it allows the user to increase the exercise resistance in a controlled manner so that the user is able to increase muscle size and strength without failure and/or injury. Additionally, by practicing the methods in accordance with the invention, some users may identify a weight increment which allows the user to continuously increase exercise intensity between workouts without causing muscle failure. As the exercise resistance is continually increased over time, each incremental increase in weight will become a smaller percentage of the total exercise resistance.

The weight system in accordance with the invention may be successfully applied to rehabilitation programs. As a result of receiving less blood flow, ligaments heal more slowly than tendons, and tendons heal more slowly than muscles. In order to rebuild all injured tissues, but especially ligaments and tendons, very small weight increases should be used. Once an appropriate starting exercise intensity is identified, a first incremental increase in weight resistance might be as little as one quarter-ounce. As the damaged tissue rebuilds itself and becomes stronger, the incremental increase in weight resistance (which is made in each successive workout) will be easier for the damaged tissues to handle. At this point, the incremental increase in weight resistance can be adjusted upwards, perhaps to one half-ounce. As the damaged tissue rebuilds itself and continues to grow in strength, small incremental adjustments to the increases in exercise intensity will be made until the perfect incremental weight increase is found. A perfect incremental increase in weight resistance allows the damaged tissue to rebuild and strengthen while the weight training exercise remains easy to perform with good weight training form. By

using such small incremental weight increases, the chances of reinjuring the damaged tissues are substantially reduced. The rehabilitative program should be continued until the full range of motion is restored, the strength of the muscles, ligaments, and/or tendons are equal on both sides of the body, and the injured tissue is fully repaired.

5 <sup>29</sup> The weight system in accordance with the invention allows for a wide variety of incremental increases. For example, if a one half-ounce increase in exercise intensity is desired, a one quarter-ounce disk can be added to each side of a standard olympic barbell weight training apparatus. Alternatively, if a cable-type weight apparatus is being used for weight training, a one half-ounce increase in exercise  
10 intensity is obtained by adding a one half-ounce disk to the weight bearing cable of the cable-type weight training apparatus. Similarly, a one-ounce increase in exercise intensity in accordance with the invention is obtained by using two one half-ounce disks with a standard olympic barbell weight training apparatus, or by adding a one-ounce disk to a weight bearing cable of a cable-type weight training apparatus.

15 By using the appropriate disks or combination of disks, the invention also allows for two-ounce, three-ounce, four-ounce, five-ounce, six-ounce, seven-ounce, eight-ounce, nine-ounce, ten-ounce, eleven-ounce, twelve-ounce, thirteen-ounce, fourteen-ounce, fifteen-ounce, sixteen-ounce, seventeen-ounce, eighteen-ounce, nineteen-ounce, twenty-ounce, twenty one-ounce, twenty two-ounce, twenty  
20 three-ounce, twenty four-ounce, twenty five-ounce, twenty six-ounce, twenty seven-ounce, twenty eight-ounce, twenty nine-ounce, thirty-ounce, thirty one-ounce, thirty two-ounce, and higher incremental increases in exercise intensity. Such a wide variety of incremental weight increases permits a user to consistently increase exercise intensity safely, *i.e.*, without sacrificing good weight training form.

25 <sup>30</sup> In FIG. 1, a perspective view of an incremental weight 10 according to the invention is shown. Each incremental weight 10 comprises a thin disk having a center opening 20 adapted to receive a standard olympic barbell and a slot 30 adapted to receive a weight-bearing cable of a cable-type weight training apparatus. The incremental weights according to the invention are generally thin, ranging in thickness  
30 from approximately 0.005 inches to approximately 0.75 inches.

35 <sup>31</sup> From FIG. 2, it can be understood how the weights according to the invention are used in conjunction with a standard olympic barbell weight training apparatus. A standard olympic barbell weight training apparatus 50 further including an incremental weight 10 in accordance with the invention is shown. While only one incremental weight 10 is depicted as being used in combination with the standard olympic barbell weight training apparatus 50 it should be noted that the weights in



accordance with the invention can be combined in any manner to produce a desired increase in exercise intensity. For example, if a person increases the intensity of an exercise by four ounces during a first workout with a standard olympic barbell weight training apparatus, and would like to increase the exercise intensity by an additional three-ounces for a subsequent workout, the total increase from the starting weight would be seven ounces. A seven ounce increase can be obtained by adding a two-ounce incremental weight, a one-ounce incremental weight, and a one half-ounce incremental weight to each side of the standard olympic barbell weight training apparatus.

In FIG. 3, an incremental weight of the invention is received by a weight bearing cable 100 of a cable-type weight 10 training apparatus 110 (only the weight stack of the cable-type weight training apparatus is shown). Again, while only one incremental weight is illustrated as being used in conjunction with the cable-type weight training apparatus, any number of incremental weights 10 in accordance with the invention can be stacked upon one another to produce a desired incremental increase in exercise intensity.

From FIG. 4, it can be understood how an incremental weight of the invention is used in conjunction with a cable-type weight training apparatus. An incremental weight 10 in accordance with the invention is shown on top of the stack of weights, and is received by a weight-bearing cable 100 of a cable-type weight training apparatus 200 for exercising a person's chest muscles. While a specific weight training apparatus is shown, any chain-type or cable-type machine can be used in combination with the weights and methods according to the invention.

Furthermore, while the weight stack of the cable-type weight training apparatus shown in FIG. 4 has a slightly different appearance than the weight stack depicted in FIG. 3, these two weight stacks simply illustrate slightly different embodiments of a cable-type weight training apparatus in accordance with the invention.

912 When the incremental weights according to the invention are used in conjunction with an olympic barbell weight training apparatus, the incremental weights must be accurately and precisely machined to the weight specified to be of maximum utility. Further, the incremental weights should be used with a set of standard, matched olympic weights in order to be of maximum utility. When all of the weights are evenly matched (i.e., having a high degree of weight precision), a user can be sure that a desired incremental increase in exercise resistance is obtained and that the user is practicing the methods in accordance with the invention.

Typically, the incremental weights in accordance with the invention are fabricated from stainless steel. However, other metals and alloys, such as, for example, brass, can also be used to fabricate the incremental weights. Stainless steel is preferable because of its desirable strength, durability, and ability to resist corrosion. The incremental weights can also be magnetized for use with standard dumbbells.

913 The fabrication process begins with the milling of the slot 30 which is adapted to receive a weight-bearing cable 100 of a cable-type weight training apparatus 200 into each incremental weight in accordance with the invention. Subsequently, the center opening 20 that is adapted to receive a standard olympic barbell is machined into each incremental weight 10. Finally, each incremental weight 10 according to the invention is precision machine ground to the exact weight desired. Each incremental weight 10 is weighed on a digital scale in order to ensure accuracy. Preferably, the incremental weights 10 of the invention are within one gram of the specified weight. More preferably, the incremental weights 10 of the invention are within one half of a gram of the specified weight. Most preferably, the incremental weights 10 of the invention are within 0.003 grams of the specified weight.

914 An incremental weight system in accordance with the invention generally includes a plurality of incremental weights ranging in weight from about one quarter-ounce to about thirty two-ounces, wherein each incremental weight comprises a thin disk having a center opening adapted to receive a standard olympic barbell and a slot adapted to receive a weight-bearing cable of a cable-type weight training apparatus. The plurality of incremental weights comprises at least one half-ounce weight, at least one one-ounce weight, at least one two-ounce weight, at least one four-ounce weight, at least one eight-ounce weight, at least one sixteen-ounce weight, and at least one thirty two-ounce weight. The plurality of incremental weights may further comprise at least one quarter-ounce weight.

The first step in undertaking any exercise is to learn proper form. It is recommended that a user start with a very light weight while learning proper form for any exercise. It is important to have proper form in both body movement and in body positioning. After the user learns the proper form for a specific exercise, increases in weight resistance can be made.

For larger muscle groups such as, for example, leg and back muscles, three-ounce to five-ounce incremental gains can generally first be made between workouts without causing muscle failure and/or injury. However, for smaller muscle

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groups, such as, for example, forearm, hand, and triceps, one half-ounce to one-ounce incremental gains can generally first be made between workouts without muscle failure and/or injury. For both children and persons affected by existing injuries, these amounts should be decreased.

5                   For the larger muscle groups of most adult users, an appropriate first increase in exercise resistance between workouts then is approximately five ounces. As stated previously, this amount may be adjusted to reflect the age, the health, and other conditions relating to the user. At some point in time, five ounce increases will be exceedingly difficult for the user to continue making between workouts. It is  
10                   important that the user not continue making incremental increases until muscle failure. When the user's form deteriorates (as previously set forth), it is time for the user to make lesser gains between workouts. Typically, a user should proceed by then making two-ounce gains between workouts. Again, before muscle failure and before the user's form substantially deteriorates, a user should switch to one-ounce gains  
15                   between workouts. Again, when the exercise becomes exceedingly difficult, one half-ounce gains between workouts can be made.

                  Although the present invention has been described in considerable detail with reference to certain preferred versions thereof, other versions are possible. Accordingly, the spirit and scope of the appended claims should not be limited to the  
20                   description of the preferred versions contained herein.

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